Project: Bonneville First Powerhouse 1:25-scale Turbine Model

PI: Robert A. Davidson

Branch/Group: Inland Hydraulic Structures Branch, Environmental Hydraulics Group

Project Description/Activities/Capabilities:

Powerhouse operations, fish-passage design, hydraulic modeling, hydraulic structures

Sponsor: Portland District. POC – Brad Bird

CHL Personnel

Bob Davidson, Marshall Thomas, Danea Polk, Jason Jackson

Project Location and Description:

Bonneville Dam is about 6400 feet long and includes two powerhouses, a spillway, two navigation locks, multiple fish ladders, and four islands. A total of six 59-megawatt units and eight 77-megawatt turbines reside in Powerhouse No. 1 and No. 2, respectfully. The 18-bay spillway is approximately 1100 feet long, and has twelve 50.75-ft-high vertical lift gates and six 60-ft-high wheel gates. The spillway crest is located at elevation 24 with a normal pool elevation ranging from 71.5 to 76.5. Spillway bays 4 through 15 and 18 have deflectors that are 12 ft long and are located at el 14. The stilling basin is a horizontal apron-type with a double row of sloping baffle blocks. The stilling basin is 147 ft long with an invert elevation of -16 for the first 71 ft and drops to el -24 for the remaining length. An irregular concrete apron is at the end of the stilling basin and usually slopes downward to the tailrace topography. The old lock is76 ft wide by 500 ft long. It discharges into a navigation channel that joins the releases from Powerhouse No. 1 approximately 1200 ft downstream of the lock. The new lock is 86 feet by 675 feet and discharges into a channel that joins the discharge from the remainder of the project about 2600 ft downstream of the lock. Powerhouse discharges and lock operation only indirectly influence the spillway flow conditions by changing the local tailwater elevation

Facilities:

Related Topic Areas: Physical models, fish passage, juvenile bypass system, vertical barrier screens, extended submerged bar screens, trashracks, debris, rivers, reservoirs, hydraulic structures